

Final Report JOINT FIRE SCIENCE PROGRAM

TITLE OF PROJECT: Long-term Dormant-Season Burning Interval Study in the Palmetto/Gallberry Fuel Complex: Establishing an Adjacent Growing-Season Burn Study and Making Both Demonstration Areas.

PROJECT LOCATION: Osceola National Forest, Olustee, FL.

JFSP PROJECT NUMBER: 01B-3-1-04

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SUMMARY OF FINDINGS:

Frequent Burning will control midstory hardwoods.

Prior to treatment, plots were dominated by longleaf pine with some slash pine in wetter areas. Control plots developed some midstory hardwoods that have changed very little since 1970. All of the burn treatments have kept hardwoods from growing into the midstory, although there are a few taller than 2 m in the 4-year burn plots. Thus, if significant hardwoods are not present, burning even every 3 or 4 years will keep pine stands in this coastal plains region open enough for Red Cockaded woodpecker (RCW) habitat.

Burning does not affect Overstory Pine Longevity.

A major concern of managers is retention of large overstory pine for RCW. Pine basal area increase in most plots because of growth and the only mortality has been from lightning strikes. Prescribed burning did not kill any overstory pines. Therefore, managers can apply prescribed burning for its many benefits without undue risk of losing the overstory pine component.

Even infrequent burning will control fuel buildup.

Understory species recover quickly after burning and therefore fuel accumulate rapidly with plots burned every 4 years containing nearly as much understory fuel as unburned controls. However, the litter layer continues to accumulate without burning and thus total fuel is much higher without burning. All burning treatments significantly reduced ground fuel loads. The annual burn plots had the lowest fuel level, but even the 4 year burns plots had substantially less fuel than unburned controls. Thus, any of the treatments could be used to keep fuel loads down and reduce wildfire hazard to a reasonable level. However, because of the flammability of the palmetto/gallberry rough, burning at least every 3 or 4 years is needed for hazard reduction.

Burn Frequency affects understory composition and richness.

Understory composition was most different on the annually burned plots. These sites had the most grass and forb cover and the least saw palmetto. Species richness was also highest on these areas. In contrast those plots burned every 4 years were dominated by saw palmetto and woody shrubs. The biennially burned plots seemed to be intermediate with more grasses and forbs and reduced palmetto cover.

Implications for Managers.

If hazard reduction were the only reason for burning, then a fire return interval of every 3 to 4 years seems adequate. However, this means a very rigid schedule must be maintained to keep fuel at acceptable levels. If constraints result in missed burn cycles, fuels will rapidly accumulate to high levels. Alternatively, the composition of the understory can be changed to increase flexibility. Once saw palmetto becomes established it is very difficult to remove with burning. To materially change the composition it seems to take a number of annual dormant season burns. There is some indication that growing season burns are more effective, but it will still require a number of burns to reduce palmetto dominance to something like historical levels because it is so resistant to fire. Once the community has been changed, burning less frequently, every 2 or 3 years may be successful for maintaining the understory community of Flatwoods.

PROJECT OVERVIEW: BACKGROUND

The coastal plains are a major geographic feature of the southern United States, stretching from Virginia to Florida and then west to Texas. Historically the area was covered by flatwood forests that had an overstory dominated by longleaf (*Pinus palustris* Mill.) and slash pine (*P. elliottii* Engelm.). Longleaf pine with its associated grassy understory dominated the slightly higher, moderately to poorly drained areas, which burned frequently, i.e. at least every 3 years. Slash pine grew in the wetter areas along the margins of ponds, bays and swamps with mixtures of the two species in the transition zone. The entire region was adapted to and dependent upon frequent low intensity fire. This frequent fire maintained relatively open stands of pine with a ground layer of grasses, herbs and small shrubs.

The extensive logging boom of the late 1800's and early 1900's left vast areas of the South with tremendous fuel levels. Many large wildfires resulted from ignition of these fuels during dry periods. These wildfires caused loss of life and property and left many acres devoid of significant tree cover. Federal and State agencies built organizations with the equipment and people to improve detection and control of these destructive wildfires. Even the coordinated efforts of a large fire fighting force, however, could not stop wildfires from occurring during significant droughts. Research and practical application began to demonstrate the usefulness of fire to control fuel buildup, thereby reducing the probability of destructive wildfires. This was especially obvious in the South where fuel accumulates rapidly and can reach high levels in 4 to 6 years. It was also recognized that fire had beneficial effects for forestry and the ecosystem when applied under controlled conditions. Thus, in the 1960's we entered an era of application of prescribed burning by trained professionals to obtain desired management objectives. The

purpose of this study was to determine the effect of different burning frequencies on community structure and composition.

APPROACH

The study was installed in 1958 by the Forest Service Research Station in a longleaf pine (*Pinus palustris*) stand with a southern rough (saw palmetto [*Serenoa repens*] / gallberry [*Ilex glabra*]) understory on the Osceola National Forest. Initially there were 6 blocks and 4 treatments in a randomized block design that were burned every 2, 4, or 6 years until 1964. At that time it was determined that 6 years was too long an interval and those plots were switched to annual burns. Since this time, plots have been regularly burned at 1, 2, and 4-year intervals during the dormant season, while control plots have been protected from all fire since 1958. Data on fuels and vegetation were collected from random square meter sample areas until 2002. Since 2002 vegetation data has been collected from 5 permanent, 15m line transects and fuels data from square meter plots located at random directions from fixed points. Because of their location along a well travel Forest Service road and proximity to a large and growing population, the plots are also being used to demonstrate the effects of prescribed burning to the public.

DELIVERABLES:

Proposed	Delivered
Annual Progress Reports	Progress Reports completed annually.
Pre and Post burn fuel and vegetation data collected and summarized.	<p>All data collected and summarized. Data was used for presentations:</p> <p>Outcalt, K.W. and Wade, D.D. 2003. Restoring flatwoods longleaf communities: Results from long-term burning on the Osceola National Forest. February 27, 2003. Annual Meeting of Coastal Plains Chapter of Society for Ecological Restoration at Athens, GA. (Poster)</p> <p>Outcalt, K.W. 2004. Long-term prescribed burning in the Southern US. November 18, 2004, Fire Science in Forestry Management Workshop in Charleston, SC. (Oral Presentation)</p> <p>Outcalt, K.W., and Wade, D.D. 2004. Response of a longleaf pine flatwood community to long-term dormant season prescribed burning. Annual Meeting Ecological Society of America, August 1 – 6, 2004, Portland, Oregon. (Poster)</p> <p>Outcalt, K.W. 2006. Used as material in 1 day</p>

	<p>course I taught to 45 students from Forest Service, BLM, NPS, and BIA at Washington Institute, Seattle, WA. May 11, 2006 on Fire Ecology, Disturbance, and Burning in Southern Forests. (Oral Presentation)</p> <p>Published vegetation data in: Glitzenstein, J.S., Streng, D.R., and Wade, D.D. 2003. Fire Frequency Effects on Longleaf Pine Vegetation in South Carolina and Northeast Florida, USA. Natural Areas Journal 23(1):22-37.</p> <p>An additional publication is in preparation and will be submitted to an appropriate Journal.</p>
Erect signs on one replication of study along major road.	Signs placed on all plots, which included all existing plots plus new plots for growing season burning portion of the study.
Erect permanent display board about study and prescribed burning.	Permanent display board constructed at road intersection adjacent to burn plots.
Create take home sheet for visitors to Display	Created and available at Display
Create web page describing area and study results	Web site created and updated as new information became available (http://www.srs.fs.usda.gov/osceola)
Field day at Demo area	<p>Conducted ½ day tour on April 5, 2005 for managers, biologist, and ecologists from National Forests across the country.</p> <p>Conducted ½ day tour on March 20, 2003 for Professor and students from University of Florida.</p>

PRODUCTS ON CD:

Handout front and back
 Poster front and back sections
 Picture of poster
 Pdf of NAJ pub.
 PDF of ESA abstract